FOREST INSECTS.

THE MARRI BORER (*TRYPHOCHARIA HAMATA*).

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This beetle belongs to the large family *Cerambycidae,* the members of which are generally known as longicorns or long-horned borers. The present example is typical of the group to which it belongs, although superficially it closely resembles the species of the allied genus *Phoracantha*. The habits of the two groups are quite different. The species of *Tryphocharia* usually breed in living trees, whilst the *Phoracantha* in general prefer dying or dead timber, and are regarded as secondary borers. The larva of the *Phoracantha* eats its way through the sap wood in all directions, making the peculiar scroll-like markings generally found under the bark of dead trees. When nearly full grown it bores for a short distance into the hard wood, where it makes a small chamber and therein pupates.

The larva of *Tryphocharia* lives only for a short time in the sap wood, most of its life being spent in the hard wood in the interior of the tree.

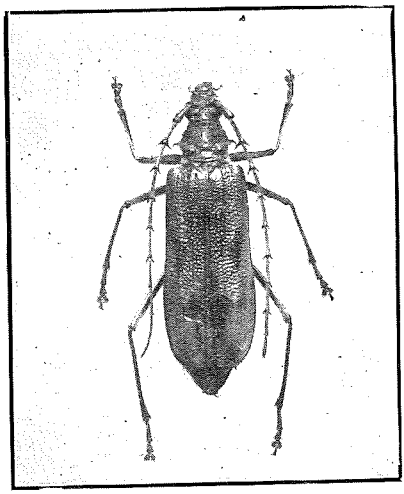

Fig. 1. (Original.)
Tryphocharia hamata (Newm.).
Female, natural size.

The female (Fig. 1) is a handsome beetle, measuring from 1½ to 2 inches in length. The wing covers are yellow; sometimes reddish yellow, with an irregular transverse brown band just in front of the middle, and an irregular blotch of the same colour behind the middle; the tips of the wing covers are always light yellow. The front part of the wing covers is deeply and coarsely punctured or pitted. These punctures become finer towards the tips which are almost smooth and shining. The tips of the wing covers are nearly straight across, not rounded, and are armed with four sharp spines. The two spines in the middle are longer and thinner than those on the outside. The thorax is reddish brown and very coarsely pitted on the top. There are

two large bluntly rounded tubercules, one on each side, behind. On each side at the middle there is a long, sharp spine, which is abruptly hooked backward at the point. The antennae do not quite reach to the tip of the wing covers; they have 11 joints; the first is large and club shaped; the second very short, and the remaining nine are about equal in length. The joints, three to eight, are armed with a sharp spine on each side at the apex. These spines are longest on the inside, on the third, fourth, and fifth joints than those on the outside; on the sixth joint both spines are equal in size; on the seventh and eighth they are longest on the outside. The antennae of *Phoracantha* have these spines only on the inside of the joints.

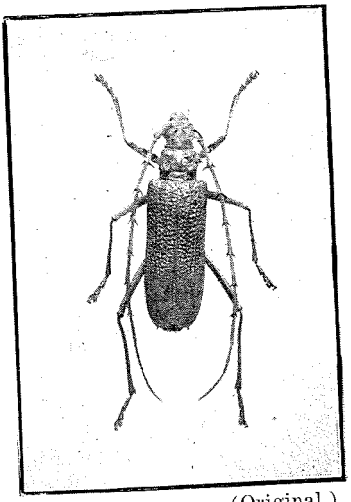

Fig. 2. (Original.)
Tryphocharia hamata (Newm.).
Male, natural size.

The male (Fig. 2) is smaller than the female, but the antennae are much longer. Otherwise they are very similar.

This beetle is found throughout the South-West from Perth to Albany. The males and females may be found flying early in the evening, at dusk, during January and February. During the day they are sometimes to be seen under loose bark on tree trunks. It attacks various Eucalypts, but appears to have a preference for Marri (*Euc. calophylla*). Other trees attacked are Tuart (*Euc. gomphocephala*), Blackbutt (*Euc. patens*), Wandoo (*Euc. redunca, Var. elata*), Red Flowering Gum (*Euc. ficifolia*), Red Tingle (*Euc. jacksoni*). Trees in all stages of growth are attacked, but for preference, young trees about a foot in diameter.

The eggs are elongate oval, almost cylindrical; they are greenish white in colour, and about one quarter of an inch long. They are of a very soft gelatinous nature, with a soft pliable skin or covering. They break at the slightest touch. When deposited by the female in the small cracks of the bark, these eggs are coated with a gummy substance which makes them adhere. On hatching from the egg the larva eats its way through the bark in a spiral direction, gradually working into the sap wood, through which it bores until strong enough to penetrate the hard wood. By the time the larva starts to bore up through the solid trunk it is about 1½ inches long. From this point it bores its way upward in a very erratic course; at times boring into the sap wood at various sides of the tree. The larva continues to bore

Fig. 3. (Original.)
Portion of Marri sapling showing typical boring and ear-like wound made by the larva, or grub. Also the exit hole from which the adult beetle has issued.

upwards to from eight to 12 feet before it is full grown. At this stage it bores completely through the sap wood and sometimes through the bark, and excavates a broad channel about 18 inches long between the hard wood and the bark, completely cutting away the sap wood. At the top of this groove it cuts the peculiar typical "ear-shaped" mark (Fig. 3), in the centre of which it again bores into the hard wood, but this time in a downward direction for a distance of nine to 12 inches, forming a large pupal chamber. While forming this chamber the material is packed hard behind the larva, with the result that the entrance is solidly plugged.

The pupal chamber is made during April and May, but the larva, although lying in the chamber does not pupate until October or November. The beetle issues during December and January. The period passed by the larva in the tree is two years. For some reason, at present unexplained, the larva sometimes make what appears to be a dummy pupal chamber, usually

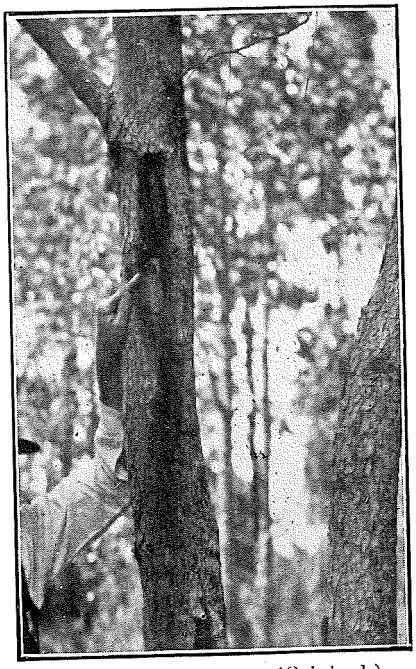

Fig. 4. (Original.)
Marri sapling showing both true (lower) and dummy (upper) entrance to pupal chamber.

only a few inches from the entrance to the true chamber (Fig. 4). This dummy is never occupied. The pual chamber is generally about 15 feet up from the ground, frequently much higher. A number of trees containing these borers were kept under observation, and traps were attached as soon as the pupal chamber was made. These traps consisted of fine fly wire gauze nailed over the exit of the chamber (Fig. 5). To reach these a ladder was made by cutting notches in a sapling as in the photograph. A dozen traps were placed in one area, Mundaring Weir, each of these contained a beetle with no traces of parasites, which is surprising, as the larva is practically exposed during the period when it is boring between the bark and the sapwood.

Many larvae fall victims to parasites when they bore into the sap wood during their erratic course upward. In numerous cases the work stops at this spot, and only the remains of the larval skins are to be found. Several *Braconid* wasps may be seen around borer infested trees, but so far none

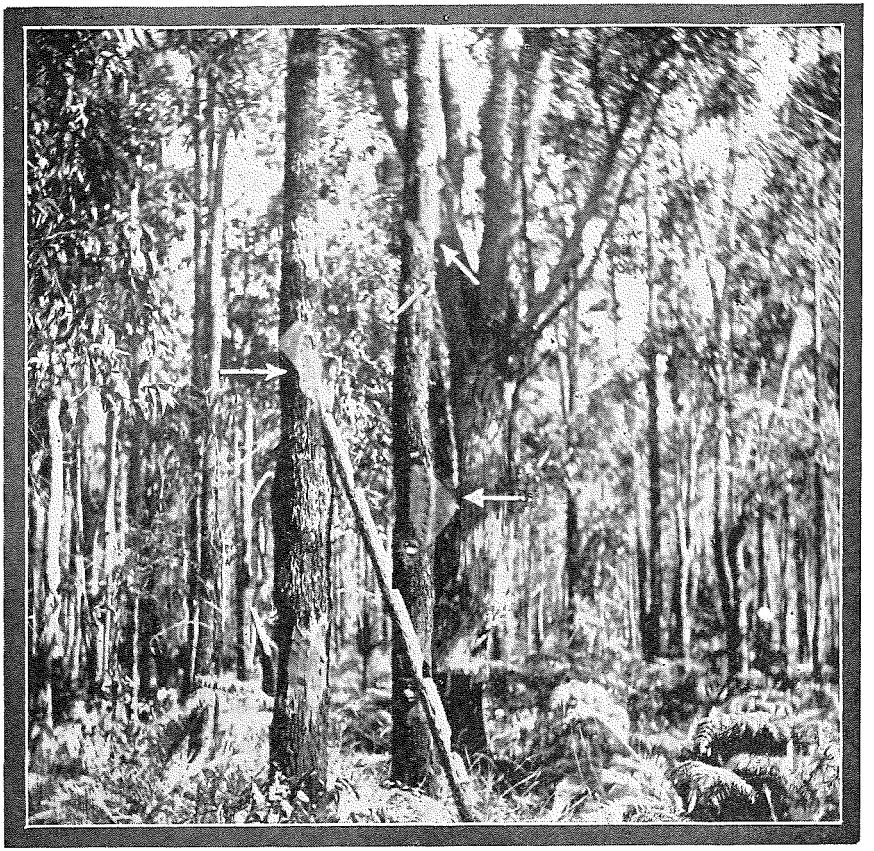

Fig. 5. (Original.)
Young Marri trees. Arrows indicate the traps attached over exit from pupal chamber.

have been reared from larvae or pupae. Black cockatoos (*Calyptorhynchus* sp.) frequently tear the bark off in their efforts to get the larvae, but from general appearances it does not seem as though they get many of them. The destruction caused by this bird is almost as bad as that done by the borer, as it frequently completes the damage by girdling the tree.

It has been recorded that this borer is the main cause of kino, or red-gum, and of gum-veins in Marri. Such, however, is not the case. Whatever the cause of kino and gum-veins may be, insects play very little, if any, part in their formation. Many trees badly affected with gum-veins have been proved after careful examination to contain no traces of borers. On the other hand Marri trees with *Tryphocharia* borers have been found entirely free from kino and from gum-veins. When the borer strikes a gum-vein the burrow fills up with the kino, and the larva is destroyed. These burrows frequently act as reservoirs for kino.